Upper Sand Creek Basin
Contra Costa County Flood Control and Water Conservation District
Water Quality and Other Expected Benefits

The following sections present a quantitative and qualitative analysis of project costs and water quality benefits.

Overview

The primary purpose of the Upper Sand Creek Basin Project (USCB or Project) is to prevent flooding along the lower reach of Marsh Creek between Sand Creek and the Marsh Creek outfall into the Sacramento-San Joaquin River at Big Break, in Oakley. The regional goal for USCB is to significantly reduce peak flows from Sand Creek into Marsh Creek, thereby reducing the flood-related risks and damages associated with a variety of storm frequency/severity events. It will also improve water quality in these receiving waters, by capturing sediment and other nonpoint source pollution carried by storm events.

The Project consists of creating a detention basin that will capture upstream flows up to and including the 100-year storm event (920 acre-feet of storage capacity). USCB will be created by enlarging an existing smaller detention basin on site that currently is not connected to the creek and therefore adds no direct capture and detention of upstream stormwaters. The enlarged basin will be hydrologically connected to the stream channel and will thus capture stormwater flows up to and including the 100-year, 6-hour storm event. Sand Creek will convey local stormwater runoff and stormwater generated in the watershed to the basin, where it will be stored and released slowly through the basin outlet, reducing peak flows downstream and reducing the potential for flooding downstream properties. Secondary purposes of USCB include habitat restoration and water quality enhancements.

A summary of all benefits and costs of the project are provided in the following table. Water quality and other expected benefits are discussed in more detail in the remainder of this attachment.

Benefit Cost Analysis Overview

	Present Value
Costs – total Capital and O&M	$11.74 M
Monetizable Benefits	
Flood Control Benefits: Avoided losses in property damages (FRAM)	$27.9 M
Total Monetized Benefits	$27.9 M
Qualitative Benefit or Cost	Qualitative Indicator*
Avoided traffic delays due to key road inundation	+
Avoided emergency response cost during floods	+
Water Quality and Other Benefits	+
Improved Surface Water Quality	+
Improved Riparian Habitat	+
Recreational and Aesthetic Benefits	+
Increased Housing Values Near New Park Acreage	+
Avoided Permitting Costs	+

O&M = Operations and Maintenance

*Direction and Magnitude of Effect on Net Benefits:
+ = Likely to increase net benefits relative to quantified estimates
++ = Likely to increase net benefits significantly
- = Likely to decrease benefits
- - = Likely to decrease net benefits significantly
U = Uncertain, could be + or -

Description of Without-Project Conditions

Between USCB and its confluence with Marsh Creek, the Sand Creek channel provides little to no flood protection from relatively minor storms. Lower Sand Creek Basin, an existing interim off-line basin, is located within this downstream reach, and will be built-out to its ultimate capacity subsequent to the completion of USCB. Downstream of Lower Sand Creek Basin, Sand Creek enters into Marsh Creek, which has engineered banks designed to protect adjacent areas from flooding up to a 50-year event.

The area at risk covers over 12,000 acres, and includes residential developments (nearly 2,000 homes), as well as over 250 commercial, industrial and institutional buildings, agricultural lands, and numerous important roads (including Highway 4) and bridges. Property tax assessment records indicate the value of existing properties in the 100-year floodplain of these creeks amounts to $759 million. These tax assessment figures are likely to understate the true market value of these properties, and do not include the value of contents and other personal property that may also be at risk in these neighborhoods. Approximately 15 percent of the properties at risk are located along the area at risk from flooding from Sand Creek ($112.4 million at risk = 15 percent of $749 million), and the remaining 85 percent of the at risk property values ($636.7 million = 85 percent of $749 million) are located in the areas subject to flooding from Marsh Creek.

Without the Project, the properties along the Sand Creek portion of the watershed will be at risk of frequent flooding from a wide range of storm events. High stormwater flow increases streambed scour and stream bank erosion, resulting in increased sedimentation. Without the reduction in peak flows that will result from this project, increased sediment and pollutant loading with continue unabated.

The Project will also install trash capture devices. Without USCB, storm related trash loading will continue to degrade surface water quality in Sand Creek, Marsh Creek and eventually the San Joaquin River and Delta. The USCB construction plan includes the creation of wetlands, riparian habitat, stream channel, and open space. These areas provide valuable habitat for special species, recreation opportunities for community members, and improve adjacent property values. Without the Project, these benefits will not be realized.

Description of Expected Water Quality and Other Benefits (With-Project Conditions)

USCB is expected to create a variety of water quality and other benefits, including improved surface water quality, improved riparian habitat, and additional recreational and aesthetic benefits. These benefits are described below.

Water Quality Benefits

The primary water quality benefit expected from USCB is improved surface water quality, resulting from decreased flooding. This project will reduce both peak pollutant loading and trash loading.

Reduction in Peak Loadings

Water quality improvements will occur as a result of decreases in loadings due to the reduction in maximum peak flow in Sand Creek generated by a 100-year, 12 hour storm from 2,818 cubic feet per second (cfs) to 131 cfs. Scouring and stream bank erosion will be reduced. This will reduce sediment loading of downstream reaches of Sand Creek, Marsh Creek and eventually the San Joaquin River and Delta.

Reduction in Trash Loadings to the Creeks and Delta

Trash loadings into the Sand Creek, Marsh Creek, the San Joaquin River, and the Delta will be reduced due to trash capture devices to be installed at major storm drain outfalls into the basin.

Other Benefits

Other benefits expected from project implementation include habitat restoration, recreation, increased housing values near the new park acreage, and avoided permitting costs.

Improved Riparian Habitat

USCB will create 0.93 acres of perennial wetlands and 4.36 acres of seasonal wetlands. These wetlands will provide valuable habitat for special status species, and is considered quality habitat for raptors, western pond turtle, burrowing owl, and others. Special status species include the California Tiger Salamander and Red-Legged Frog. The addition of 0.6 acres of riparian habitat and 3,612 feet of stream channel will support a suite of native plants and exhibit enhanced functions for wildlife. Current conditions are considered to be of highly degraded biological value.

Recreational and Aesthetic Benefits

A 62.5-acre open space park will be created. The City of Antioch has plans for construction of a sports park within the Project area. The bottom of the basin has been laid out to accommodate a number of sports fields that can be used for soccer, football, and baseball/softball, and the basin design was configured so that this sports park may be constructed without significant earthmoving. The construction of the sports park is in the conceptual state, and there is currently no target date for construction.

Increased Housing Values Near New Park Acreage

Parcels adjacent to USCB are slated for housing developments, and with construction of the Project setting aside 62 acres for use as open space and sports park, increased housing values are anticipated. Economic research has shown that greenbelts and open space in or surrounding residential areas can have significant positive impact on housing values, but impact on property values varies greatly depending on the types of park. For parks that are closer to unimproved open space, rather than parks with recreation development such as ball fields, value increases in the range of 5 to 10 percent are most common.

Avoided Permitting Costs

The Contra Costa County Flood Control and Water Conservation District (District) will minimize Habitat Conservation Plan (HCP) fees by mitigating on site via the construction of the restoration area. If USCB was not built, the District would have to either raise the levees or widen the channel of Marsh Creek. Environmental restoration costs for raising levees or widening the channel are much greater due to the length of channel that would be impacted. Construction of USCB has a much lower environmental impact and required mitigation.

Project Beneficiaries and Distribution of Benefits

The proposed project includes the full range of beneficiaries, as summarized in the following table. At the local level, communities along Sand Creek and Marsh Creek in the Cities of Brentwood and Oakley will have significant reductions in 100-year flood impacts and in the quantity of trash deposited during flooding. At the regional level, native species, including special status species such as the Red Legged Frog and California Tiger Salamander, will benefit from increased and improved natural habitat. As the project will minimize the flooding of major roads in the area, the entire population of the two cities will benefit. The project will also benefit the City of Antioch, as Antioch has planned a sports park for the basin. At the statewide level, the Sacramento – San Joaquin Bay – Delta will benefit from reduced flood related sedimentation and trash loading.

Project Beneficiaries Summary

Local	Regional	Statewide
Communities along Upper Sand Creek and Marsh Creek in the City of Brentwood	Cities of Oakley, Brentwood, and Antioch Native Species, including the Red Legged Frog and California Tiger Salamander	Sacramento-San Joaquin Bay-Delta

Timing of Benefits

Construction of the expanded detention basin will be completed in 2015. For this analysis, a 50-year useful project life is assumed, thus benefits and costs are calculated through 2065 (50 years after the project comes online). Antioch's sports park will be built at some later date when funds become available.

Summary of Qualitative Benefits

Qualitative benefits from the proposed project include improved water quality in Marsh Creek and the Delta, restored habitat and preservation of open space, increased recreational access, and minimized environmental disturbance. These benefits are summarized in the following table.

Qualitative Benefits Summary – Water Quality and Other Benefits

Benefit	Qualitative Indicator
Avoided Traffic Delays Due to Key Road Inundation	+
Avoided Emergency Response Costs During Floods	+
Water Quality and Other Benefits:	
• Improved Water Quality	+
• Improved Riparian Habitat	+
• Recreational and Aesthetic Benefits	+
• Increased Housing Values Near New Park Acreage	+
• Avoided Permitting Costs	+

Uncertainty of Benefits

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with improved surface water quality. In this case, the omission leads to a downward bias in benefits, as described in the following table.

Omissions, Biases, and Uncertainties, and Their Effect on the USCB Project

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Improved Surface Water Quality	+	The habitat restoration area may also serve as a biofilter, reducing pollutant concentrations downstream.
Reduced Flood Impacts	++	In any given year, the probability that a 100-year storm occurs is 1 percent. This 1 percent probability of significant damage to Brentwood and Oakley is mitigated with the construction of USCB.

*Direction and Magnitude of Effect on Net Benefits:
+ = Likely to increase net benefits relative to quantified estimates
++ = Likely to increase net benefits significantly
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Potential Additional Project Features and Associated Additional Benefits

Several additional project attributes may be incorporated into the project to provide additional benefits.

Addition of a full trash capture device (FTCD) into the project would reduce trash impacts on downstream stretches of Sand Creek and tributary water bodies. Incorporation of a properly-designed FTCD could enable both the City of Antioch and the Contra Costa County Flood Control and Water Conservation District to fully or partially comply with the trash load reduction requirements of Provision C.10 of their Municipal Separate Storm Sewer System (MS4) NPDES Permit. Any FTCD that would comply with those regulations must be designed to remove all trash particles retained by a 5mm mesh screen from stormwater runoff entering the USCB, and must be sized for the one-year, one-hour storm.

Potential Adverse Effects

Adverse effects associated with this project are expected to be limited to temporary construction impacts.